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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/780,682	02/08/2001	Do-Young Lee	000939072310	8252

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EXAMINER

VIEAUX, GARY

ART UNIT	PAPER NUMBER
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2612

DATE MAILED: 07/14/2004

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/780,682	Applicant(s) LEE, DO-YOUNG	
	Examiner Gary C. Vieaux	Art Unit 2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification recites "Use of a square image sensing area *increases* the distance between image sensing areas of adjacent pixels (Emphasis added)" on page 4 lines 7-8, as well as references this configuration advantage again on page 5 lines 14-33, whereas claims 6-8 recite "using a substantially square image sensing region within each pixel to *reduce* the distance between the image sensing regions of neighboring pixels (Emphasis added)",

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Claim 2 recites the limitation "the source transistor" in line 1. There is insufficient antecedent basis for this limitation in the claim. This claim will be directly addressed on

its merits as best interpreted/understood by the examiner, with "transfer transistor" being substituted for "source transistor" in order to better follow from claim 1.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 1, 2, 4, 5, and 6** are rejected under 35 U.S.C. 102(e) as being anticipated by Sakurai et al. (US #6,633,334).

8. Regarding claim 1, Sakurai teaches a CMOS pixel for use in a CMOS imager, comprising: a.) a photodiode having a substantially square-shaped image sensing area (Fig. 12 indicator PD1), an anode coupled to ground and a cathode (Fig. 1 indicator PD); b.) a transfer transistor (Fig. 1, indicator MS11) having a drain coupled to the cathode of the photodiode, a gate controlled by a control signal, Tx (Fig. 1, indicator TX), and a source coupled to a floating sensing node; c.) a reset transistor (Fig. 1, indicator MS12) having a drain coupled to a reset potential, a gate controlled by a control signal, Rx (Fig. 1, indicator RES), and a source coupled to the floating sensing node; and d.) a source follower (Fig. 1, indicators MS13 and MS14) coupled between

the floating node and an output of the unit pixel, the source follower controlled by a select signal (Fig. 1, indicator RES).

9. Regarding claim 2, Sakurai teaches all the limitations of claim 2 (see the 102 rejection to claim 1 supra), including the teaching by Sakurai wherein the transfer transistor, reset transistor and source follower are positioned along at least two sides of the image sensing area (Figs. 7 and 12.)

10. Regarding claims 4 and 5, Sakurai teaches an array of CMOS pixels, each pixel comprising a substantially square image sensing region (Fig. 12 indicators PD1-PD3.) As to the claim limitations wherein a distance between the image sensing regions of neighboring pixels is optimized to reduce crosstalk between the neighboring pixels or wherein the distance is further optimized to improve MTF, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997.) The instant reference teaches the structural limitations of the apparatus as cited above, and therefore meets the claim limitations as recited.

11. Regarding claim 6, Sakurai teaches an imaging array for use in a CMOS imaging system, which uses a substantially square image sensing region within each pixel (Fig. 12 indicators PD1-PD3.) As to the claim limitation of using the substantially square image sensing region within each pixel to reduce the distance between the image sensing regions of neighboring pixels, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished

from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997.) The instant reference teaches the structural limitations of the apparatus as cited above, and therefore meets the claim limitations as recited.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. **Claims 3, 7, and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai et al. (US #6,633,334) in view of Guidash et al. (US #5,986,297.)

14. Regarding claim 3, Sakurai teaches all the limitations of claim 3 (see the 102 rejection to claim 1 supra), except for a teaching wherein the pixel further comprises a substantially hemispherically-shaped microlense positioned substantially over the image sensing area. Guidash teaches a pixel having a substantially hemispherically-shaped microlense positioned substantially over the image sensing area (Fig. 1A and 1B, indicator 6.) It is noted that Guidash also teaches a photodiode having a substantially square-shaped image sensing area (col. 3 lines 32-35 and col. 4 lines 1-2.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to position a substantially hemispherically-shaped microlense substantially over the

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image sensing area as taught by Guidash, with the pixel design taught by Sakurai. One of ordinary skill in the art at the time the invention was made would have been motivated to employ this combination of teachings so that light is focused through the microlense onto the image sensing area (Fig. 1A; col. 3 lines 38-41.)

15. Regarding claim 7, Sakurai teaches all the limitations of claim 7 (see the 102 rejection to claim 6 supra), except for a teaching wherein the imaging array further comprises a microlense, positioned over the image sensing area of each pixel to increase the effective fill factor. Guidash teaches an imaging array comprising a microlense positioned over the image sensing area of each pixel (Fig. 1A; col. 4 lines 1-5.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to positioned a microlense over the image sensing area of each pixel as taught by Guidash, with the pixel design taught by Sakurai. One of ordinary skill in the art at the time the invention was made would have been motivated to employ this combination of teachings so that light is focused through the microlense onto the image sensing area (Fig. 1A; col. 3 lines 38-41.) As to the claim limitation of positioning the microlense over the image sensing area of each pixel to increase the effective fill factor, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997.) The instant reference teaches the structural limitations of the apparatus as cited above, and therefore meets the claim limitations as recited.

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16. Regarding claim 8, Sakurai and Guidash teach all the limitations of claim 8 (see the 103 rejection to claim 7 supra), including a teaching by Sakurai of a pixel comprising: a.) a transfer transistor (Fig. 1, indicator MS11) having a drain coupled to the cathode of the photodiode, a gate controlled by a control signal, Tx (Fig. 1, indicator TX), and a source coupled to a floating sensing node; b.) a reset transistor (Fig. 1, indicator MS12) having a drain coupled to a reset potential, a gate controlled by a control signal, Rx (Fig. 1, indicator RES), and a source coupled to the floating sensing node; and c.) a source follower (Fig. 1, indicators MS13 and MS114) coupled between the floating node and an output of the unit pixel, the source follower controlled by a select signal (Fig. 1, indicator SEL).

Inventorship

17. In view of provisional application 60/182,044 filed 02/11/2000, to which this nonprovisional application claims benefit, a discrepancy in inventorship has been found to exist. The provisional application lists the applicants as Oh-Bong Kwon and Do-Young Lee, both of Kyongki-do, Republic of Korea, whereas the nonprovisional application lists only Do-Young Lee. Accordingly, a clarification by the applicant regarding this discrepancy in inventorship is requested.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

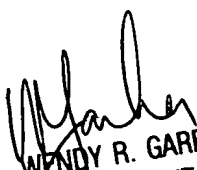
Baek (US #5,595,930) teaches a substantially hemispherically-shaped microlense over a substantially square image sensing region.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary C. Vieaux whose telephone number is 703-305-9573. The examiner can normally be reached on Monday - Friday, 8:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on (703) 305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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